Sky Tutorials

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IIT-JEE | NEET | Foundation

NEET

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CLASSROOM CONTACT PROGRAMME

(ACADEMIC SESSION 2023-2024)

Class – XII - NEET – 2023

Test Type: Chapter wise Test **Date: 29/09/2023**

PHYSICS
Instructions

Duration of test 60 min and questions Paper contains ***50*** *questions. The maximum marks are* ***180.*** *Section –A contains* ***35 Questions*** *Section B contains* ***15*** *questions. Please ensure that the Questions paper you have received contains* ***ALL THE QUESTIONS*** *in each Part.*

PHYSICS

Section – A

1. Two point charges A and B, having charges +Q and –Q respectively, are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, then force between the charges becomes

(a) $\frac{9F}{16}$ (b) $\frac{9F}{9}$ (c) $\frac{4f}{3}$ (d) F

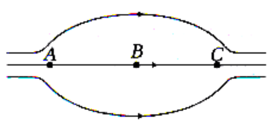
2. Two particles of equal mass m and charge q are placed at a distance of 16 cm. They do not experience any force. The value of $\frac{q}{m}$ is

(a) l (b) $\sqrt{\frac{\mu\varepsilon_0}{G}}$ (c) $\sqrt{\frac{G}{4\pi\varepsilon_0}}$ (d) $\sqrt{4\pi\varepsilon_0 G}$

3. The charge on two shperes are $+7\mu C$ and $-5\mu C$, respectively. They experience a force F. If each of them is given an additional charge of $-2\mu C$, then the new force attraction will be

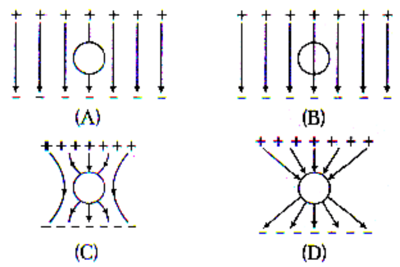
(a) F (b) $F/4$ (c) $F/\sqrt{3}$ (d) 2F

4. The figure shows some of the electric field lines corresponding to an electric field. The figure suggests



(a) $E_A > E_B > E_C$ (b) $E_A > E_B = E_C$
(c) $E_A = E_C > E_B$ (d) $E_B < E_A = E_C$

5. An uncharged sphere of metal is placed in between two charged plates as shown. The lines of force look like



(a) A (b) B (c) C (d) D

6. The electric field at a point on the equatorial plane at a distance r form the centre of a dipole having dipole moment p is given by ($r >>$ separation of two charges forming the dipole, $\varepsilon_0 =$ permittivity of free space)

(a) $E = \frac{P}{4\pi\varepsilon_0 r^3}$ (b) $E = \frac{2P}{4\pi\varepsilon_0 r^3}$

(c) $E = -\frac{P}{4\pi\varepsilon_0 r^2}$ (d) $E = -\frac{P}{4\pi\varepsilon_0 r^3}$

7. Two plates are 2 cm apart and a potential difference of 10 V is applied between them, then the electric field between the plates is

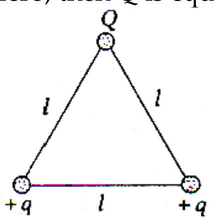
(a) $20 NC^{-1}$ (b) $500 NC^{-1}$ (c) $5 NC^{-1}$ (d) $250 NC^{-1}$

8. The electric potential V is given as a function fo distance x (metre) by $V = (5x^2 + 10x - 9)$ V. Value of electric field at x = 1 is
(a) $-20\,Vm^{-1}$ (b) $6\,Vm^{-1}$ (c) $11\,Vm^{-1}$ (d) $-23\,Vm^{-1}$

9. The diameter of a hollow metallic sphere is 60 cm and the sphere carries a charge of 500 μC. The potential at a distance of 100 cm from the centre of the sphere will be
(a) $6\times10^{7}\,V$ (b) $7\times10^{6}\,V$ (c) $4.5\times10^{6}\,V$ (d) $5\times10^{6}\,V$

10. For dipole $q = 2\times10^{-6}\,C$ and d = 001 m, calculate the maximum torque for this dipole if $E = 5\times10^{5}\,N/C$.
(a) $1\times10^{-3}\,N/m$ (b) $10\times10^{-3}\,N/m$
(c) $10\times10^{-3}\,N/m$ (d) $1\times10^{2}\,N/m$

11. Three charges Q + q and + q are placed at the vertices of an equilateral triangle of side *l* as shown in the figure. If the net electrostatic energy of the system is zero, then Q is equal to

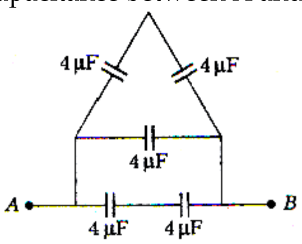


(a) $\frac{-q}{2}$ (b) –q (c) + q (d) zero

12. The capacity of a spherical conductor is
(a) $\frac{R}{4\pi\varepsilon_0}$ (b) $\frac{4\pi\varepsilon_0}{R}$ (c) $4\pi\varepsilon_0 R$ (d) $4\pi\varepsilon_0 R^2$

13. Four capacitor of equal capacitance have an equivalent capacitance C_1 when connected in series and an equivalent capacitance C_2 when connected in parallel. The ratio $\frac{C_1}{C_2}$ is
(a) $\frac{1}{4}$ (b) $\frac{1}{16}$ (c) $\frac{1}{8}$ (d) $\frac{1}{12}$

14. Equivalent capacitance between A and B is

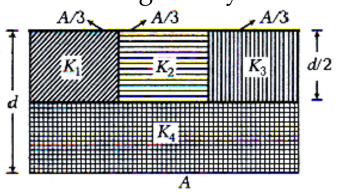


(a) $8\,\mu F$ (b) $6\,\mu F$ (c) $26\,\mu F$ (d) $\frac{10}{3}\,\mu F$

15. Separation between the paltes of a parallel plate capacitor is d and the area of each plate is A. When a slab of material of dielectric constant K and thickness $t (t < d)$ is introduced between the plates, its capacitance becomes
(a) $\frac{\varepsilon_0 A}{d + t\left(1 - \frac{1}{K}\right)}$ (b) $\frac{\varepsilon_0 A}{d + t\left(1 + \frac{1}{K}\right)}$
(c) $\frac{\varepsilon_0 A}{d - t\left(1 - \frac{1}{K}\right)}$ (d) $\frac{\varepsilon_0 A}{d - t\left(1 + \frac{1}{K}\right)}$

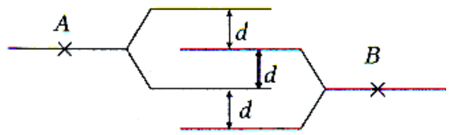
16. In a certain region of space with volume 0.2 m^3, the electric potential is found to be 5 V throughout. The magnitude of electric field in this region is
(a) 0.5 N/C (b) 1 N/C
(c) 5 N/C (d) zero

17. A parallel plate capacitor of area A, plate separation d and capacitance C is filled with four dielectric materials having dielectric constants K_1, K_2, K_3 and K_4 as shown in the figure below. If a single dielectric material is to be used to have the same capacitance C in this capacitor, then its dielectric constant K is given by



(a) $K = K_1 + K_2 + K_3 + 3K_4$
(b) $K = \frac{2}{3}(K_1 + K_2 + K_3) + 2K_4$
(c) $\frac{2}{K} = \frac{3}{K_1 + K_2 + K_3} + \frac{1}{K_4}$
(d) $\frac{1}{K} = \frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_3} + \frac{3}{2K_4}$

18. The equivalent capacity between points A and B in figure will be, while capacitance of each capacitors is 3 μF

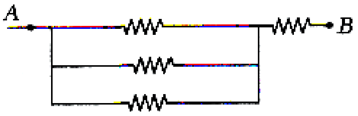


(a) $2\mu F$ (b) $8\mu F$ (c) $16\mu F$ (d) $32\mu F$

19. The current through a wire depends on time as $I = 3t^2 + 2t + 5$. The charge flowing through the cross-section of the wire in time interval between t = 0 to t = 2s is
(a) 22 C (b) 20 C (c) 18 C (d) 5C

20. Drift velocity v_d varies with the intensity of electric field as per the relation,
(a) $v_d \propto E$ (b) $v_d \propto \frac{1}{E}$
(c) v_d = constant (d) $v_d \propto E^2$

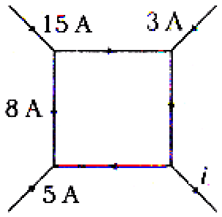
21. If all the resistors shown have the value 2Ω each, the equivalent resistance over AB is.



(a) 2Ω (b) 4Ω

(c) $1\frac{2}{3}\Omega$ (d) $2\frac{2}{3}\Omega$

22. The figure shows a network of currents. The current *i* will be

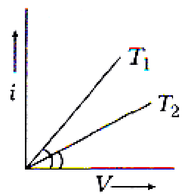


(a) 3A (b) 13 A (c) 23 A (d) -3A

23. A student has 10 resistors of resistance r each. The minimum resistance made by him from given resistors is

(a) 10r (b) $\frac{r}{10}$ (c) $\frac{r}{100}$ (d) $\frac{r}{5}$

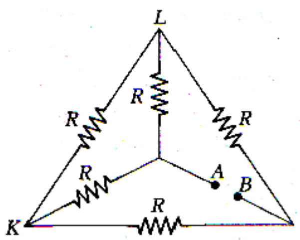
24. The current –voltage graph for a given metallic wire at two different temperatures T_1 and T_2 is shown in the figure. The temperatures T_1 and T_2 are related as



(a) $T_1 > T_2$ (b) $T_1 < T_2$

(c) $T_1 = T_2$ (d) $T_1 > 2T_2$

25. Each of the resistance in the network shown in the figure is equal to R. The resistance between the terminals A and B is



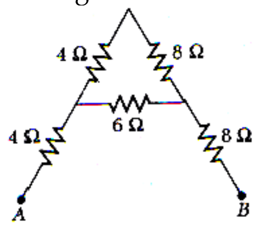
(a) R (b) 5R (c) 3R (d) 6R

26. A charged particle having drift velocity of $7.5\times10^{-4}\,ms^{-1}$ in an electric field of $3\times10^{-10}\,Vm^{-1}$, has a mobility (in $m^2V^{-1}s^{-1}$) of

(a) 2.5×10^{6} (b) 2.5×10^{-6}

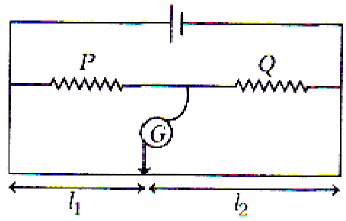
(c) 2.25×10^{-15} (d) 2.25×10^{15}

27. The equivalent resistance between A and B for the mesh shown in the figure is



(a) 7.2Ω (b) 16Ω (c) 30Ω (d) 4.8Ω

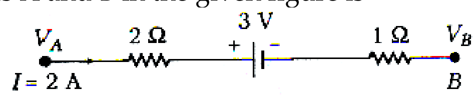
28. The meter bridge shown in the balance position with $\frac{P}{Q}=\frac{l_1}{l_2}$. If we now interchange the positions of galvanometer and cell, will the bridge work? If yes, that will be balanced condition?



(a) Yes, $\frac{P}{Q}=\frac{l_2-l_1}{l_2+l_1}$ (b) No, no null point

(c) Yes, $\frac{P}{Q}=\frac{l_2}{l_1}$ (d) Yes, $\frac{P}{Q}=\frac{l_1}{l_2}$

29. The potential difference $(V_A - V_B)$ between the points A and B in the given figure is



(a) –3V (b) +3V (c) +6V (d) +9V

30. Consider the combination of resistor,

The equivalent resistance between a and b is

(a) $\frac{R}{6}$ (b) $\frac{2R}{3}$ (c) $\frac{R}{3}$ (d) 3R

31. An electron revolves in a circle at the rate of 10^{19} rounds per second. The equivalent current is $(e = 1.6\times10^{-19}\,C)$

(a) 1.0 A (b) 1.6 A (c) 2.0 A (d) 2.6 A

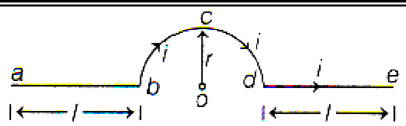
32. A long solenoid of 50 cm length having 100 turns carries a current of 2.5 A. The magnetic field at the centre of solenoid is

(Take, $\mu_0 = 4\pi\times10^{-7}\,T\,m\,A^{-1}$)

(a) $3.14\times10^{-4}\,T$ (b) $6.28\times10^{-5}\,T$

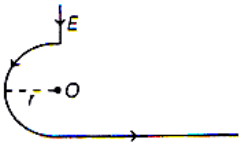
(c) $3.14\times10^{-5}\,T$ (d) $6.28\times10^{-4}\,T$

33. A long wire having a semicircular loop of radius r carries a current *i* as shown in figure. The magnetic induction at the centre O due to entire wire is



(a) $\frac{\mu_0 i}{4r}$ (b) $\frac{\mu_0 r^2}{4r}$ (c) $\frac{\mu_0 i}{4r^2}$ (d) None

34. In the given figure, what is the magnitude field induction at point O?



(a) $\frac{\mu_0 I}{4\pi r}$ (b) $\frac{\mu_0 I}{4r}+\frac{\mu_0 I}{2\pi r}$
(c) $\frac{\mu_0 I}{4r}+\frac{\mu_0 I}{4\pi r}$ (d) $\frac{\mu_0 I}{4r}-\frac{\mu_0 I}{4\pi r}$

35. Equal currents are passing through two very long and straight parallel wires in the same direction. They will
(a) attract each other
(b) repel each other
(c) lean towards each other
(d) Neither attract nor repel each other

Section – B

36. Two similar coils of radius R are lying concentrically with their planes at right angles to each other. The current flowing in them are I and 2I, respectively. The resultant magnetic field induction at the centre will be
(a) $\frac{\sqrt{5}\mu_0 I}{2R}$ (b) $\frac{3\mu_0 I}{2R}$ (c) $\frac{\mu_0 I}{2R}$ (d) $\frac{\mu_0 I}{R}$

37. The effective length of magnet is 31.4 cm and its pole strength is 0.8 Am. The magnetic moment, if it is bent in the form of a semicircle is ……. A-m^2.
(a) 1.2 (b) 1.6 (c) 0.16 (d) 0.12

38. A magnetic wire of dipole moment $4\pi A-m^2$ is bent in the form of semicircle. The new magnetic moment is
(a) $4\pi A-m^2$ (b) $8 A-m^2$
(c) 4 A-m^2 (d) None of these

39. The magnetic flux linked with a vector area **A** in a uniform magnetic field **B** is
(a) $\mathbf{B}\times\mathbf{A}$ (b) AB (c) **B.A** (d) $\frac{B}{A}$

40. The magnetic flux ϕ (in weber) in a closed circuit of resistance 10Ω varies with time t (in second) according to equation $\phi = 6t^2 - 5t + 1$. The magnitude of induced current at t = 0.25 s is
(a) 1.2 A (b) 0.8 A (c) 0.6 A (d) 0.2 A

41. A conducting rod of length l is falling with a constant velocity v perpendicular to a uniform horizontal magnetic field B. A potential difference between its two ends will be
(a) 2 Blv (b) Blv (c) $\frac{1}{2}Blv$ (d) $B^2 l^2 v^2$

42. If the reflected ray is rotated by an angle of 4θ in anti-clockwise direction, then the mirror was rotated by
(a) 2θ in anti-clockwise direction
(b) 4θ in anti-clockwise direction
(c) 2θ in clockwise direction
(d) 4θ in clockwise direction

43. An object is placed at a distance of 30 cm from a concave mirror and its real image is formed at a distance of 30 cm from the mirror. The focal length of the mirror is
(a) –15 cm (b) –45 cm (c) –30 cm (d) –20 cm

44. The refractive index of a certain glass is 1.5 for light whose wavelength in vacuum is 6000 $\overset{0}{A}$. The wavelength of this light when it passes through glass is
(a) 4000 $\overset{0}{A}$ (b) 6000 $\overset{0}{A}$ (c) 9000 $\overset{0}{A}$ (d) 15000 $\overset{0}{A}$

45. Absolute refractive indices of glass and water are $\frac{3}{2}$ and $\frac{4}{3}$. The ratio of velocities of light in glass and water will be
(a) 4 : 3 (b) 9 : 8 (c) 8 : 9 (d) 3 : 4

46. The critical angle of a prism is 30^0. The velocity of light in the medium is
(a) $1.5\times10^8 m/s$ (b) $3\times10^8 m/s$
(c) $4.5\times10^8 m/s$ (d) None of the above

47. The critical angle of a prism is 30^0. The velocity of light in the medium is
(a) $1.5\times10^8 m/s$ (b) $3\times10^8 m/s$
(c) $4.5\times10^8 m/s$ (d) None of the above

48. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm. The power of combination is
(a) –1.5D (b) –6.5D (c) +6.5D (d) +1.5D

49. A plano-convex lens of curvature of 30 cm and refractive index 1.5 produces a real image of an object kept 90 cm from it. What is the magnification?
(a) 4 (b) 0.5 (c) 1.5 (d) 2

50. The momentum of the photon of wavelength 5000 A^0 will be
(a) $1.3\times10^{-27} kg-ms^{-1}$ (b) $1.3\times10^{-28} kg-ms^{-1}$
(c) $4\times10^{-29} kg-ms^{-1}$ (d) $4\times10^{-18} kg-ms^{-1}$